

REMARKS

Reconsideration of the rejections contained in the Office Action is respectfully requested. By this amendment, the specification has been amended, claims 7, 12-15, 17, and 20 have been amended. Currently, claims 1-5, 7, 9, 11-17, and 20 are pending in this application.

Rejection under 35 USC 112, first paragraph

Claims 1-5, 7-9, 11-17, and 20 were rejected under 35 USC 112, first paragraph as failing to comply with the written description requirement. Specifically, the Examiner has taken the position that the recitation of “distributing connection information associated with flows on the protection cycle to all nodes on the protection cycle...” is not supported by the specification. The Examiner raises several points, each of which will be addressed:

First, the Examiner contends that the specification discloses a ring whereas claim 1 recites a protection cycle. The specification discloses physical rings and logical rings. For example, at page 2, paragraph 5, lines 6-8, applicants state that logical restoration paths in a mesh-network are commonly referred to as p-cycles. Then, in the last sentence of that paragraph, applicants state: “Rings, p-cycles, and other loop-related protection arrangements will be referred to herein as protection cycles.” Accordingly, the term “protection cycle” is a generic term with species including rings and p-cycles.

Applicants describe the physical ring embodiment in paragraphs 28-59. Then, starting at paragraph 60, applicants explain how the same techniques may be implemented in connection with the logical ring (p-cycle) embodiment. Since the specification contains support for each of the species, applicants respectfully submit that the specification also contains support for the generic term “protection cycle”. See MPEP 2164.08

As support for the Examiner’s position, the Examiner stated that if it is arguable that a ring is equivalent to a protection cycle, then it is rhetorical for claim 4 to recite that the protection cycle is a ring. Applicants respectfully submit that the term “protection cycle” is the generic term, and that “ring” is a species. Accordingly, claim 4 is proper.

Second, the Examiner indicated that the specification discloses a failure of a node, whereas claim 1 recites a failure on the protection cycle. The Examiner stated that a failure could be on a node or on a link, and, accordingly, felt that claim 1 was not supported by the specification. Applicants respectfully direct the Examiner to paragraph 30 of the specification as

originally filed. Specifically, paragraph 30 starts with the sentence “Fig. 2 illustrates a link failure on the ring.” Accordingly, applicants respectfully submit that the specification contains support for the full scope of the phrase “failure on the protection cycle” since the specification describes both node failures and link failures.

The Examiner also indicated that the specification discloses calculating where the various flows will be placed, whereas claim 1 recites determining the protection transmission unit allocation for the flows. Support for the claim limitation may be found in paragraph 27 of the specification, which recites:

As described in greater detail below, protection transmission unit allocation may be determined by disseminating connection information, connection identification information, and a prioritization scheme, to nodes on the network and allowing them to deterministically allocate protection transmission units to connections on the network. In this way, network elements forming physical or logical rings may ascertain the location on protection for a given connection without requiring maps to be distributed by a central controller. By enabling each network element to make an independent determination, it is possible for each network element to determine the location of traffic of particular interest without requiring communication of the location information from a central control module. By providing each network element with connection information for flows being handled by the NE and a priority mechanism, it is possible to allow each element to make a determination and, since each is starting with the same information and running the same location determination, each will end up with the same result. Aspects of the invention may be employed for example in a SONET/SDH based network, a mesh network, or other type of network with dedicated protection paths and transmission allocations on those protection paths.

As is clear from this paragraph, and from many other paragraphs, the specification is not narrowly written to discuss only “calculating where the flows will be placed” but rather uses the term “protection transmission unit allocation” in connection with describing embodiments of the invention.

Finally, the Examiner indicated that the specification did not mention calculation or determination based on the information associated with the flows, whereas claim 1 recites determining the protection transmission unit allocation for the flows from the connection information associated with the affected flows. Claim 1 recites: “determining, by each node on

the protection cycle, the protection transmission unit allocation for the flows affected by the failure from the connection information associated with the affected flows.”

Paragraph 27, recited above, states: “By providing each network element with connection information for flows being handled by the NE and a priority mechanism, it is possible to allow each element to make a determination and, since each is starting with the same information and running the same location determination, each will end up with the same result.” Additional support is contained in paragraphs 40, 50, 63, and in other places in the specification. These portions provide support for the claim language.

Applicants respectfully submit that claim 1 is fully supported by the specification as originally filed. Accordingly, applicants respectfully request that the rejection of claim 1 under 35 USC 112, first paragraph, be withdrawn. Since issues of support are often easier to discuss than they are to write, applicants invite the Examiner to call the undersigned to discuss this matter if the Examiner believes that a further rejection of the claims under this statutory subsection is required.

Rejection under 35 USC 112, second paragraph

Claims 2-3, 5, 7, 11-15, 17, and 20 were rejected under 35 USC 112, second paragraph, as indefinite. The first issue raised by the Examiner relates to the use of the terms “AZ” and “A/Z”. In paragraph 33, applicants state that “Each of the flows on the ring has an AZ information associated with it, wherein A represents the location where the flow enters the ring and Z represents the location where the flow leaves the ring.” In paragraph 35, applicants use the term “A/Z” to describe the same thing. Thus, the specification uses these terms interchangeably. A person skilled in the art would not be confused or think that they were referring to different features. Accordingly, applicants respectfully request the Examiner to withdraw this rejection.

Applicants have amended the claims to address the other points raised by the Examiner and, accordingly, respectfully request the Examiner to withdrawn the rejection in connection with those claims.

The Examiner raised several antecedent basis issues starting on the top of page 5 of the office action. In connection with claim 5, the Examiner stated that “the failure on the ring” conflicted the recitation in claim 1 of “a failure on the protection cycle.” Claim 5 depends from

claim 4. Claim 4 recites that the protection cycle is a ring. Accordingly, by implication, if there is a failure on the protection cycle, and the protection cycle is a ring, the natural way to refer to the failure is to refer to the failure as a failure on the ring. Applicants are thus not certain how to better express this concept in claim 5. Applicants are willing to amend the claim if the Examiner feels that there is a better way or if the Examiner knows of different language that would be more clear.

In connection with claim 11, the Examiner indicated that “the nodes” didn’t have antecedent basis. This term has antecedent basis in claim 1. Specifically, claim 1 recites “distributing connection information associated with flows on the protection cycle to all nodes on the protection cycle” (emphasis added).

In connection with claim 11, the Examiner also indicated that, in line 3, the term “the ring” lacked antecedent basis. Claim 11 is reproduced below (emphasis added):

Claim 11. The method of claim 1, wherein the protection cycle is a ring, wherein the nodes are nodes on the ring, and wherein the connections are connections that are provisioned through at least two nodes on the ring.

As is clear from this claim, the second recitation of “the ring” refers back to the first recitation of “ring” on line one of the claim. Accordingly, applicants submit that this term has antecedent basis and, thus, complies with 35 USC 112, second paragraph.

In connection with claim 17, the Examiner indicated that the term “connection information for connections protected by the logical restoration path” and “nodes on the logical restoration path” lacked antecedent basis. Claim 16 recites that the protection cycle is a logical restoration path. Hence, this aspect has antecedent basis. Similarly, claim 1 recites that the protection cycle has nodes, etc. Thus, when read in context, the claim is not believed to be vague. However, applicants have changed the term “connections” to “flows” to conform the terms of this claim with those used in claim 1.

Rejection under 35 USC 103

Claims 1-5, 7, and 11 were rejected under 35 USC 103 as unpatentable over Ellinas (U.S. Patent No. 6,331,905) in view of Andersson (U.S. Patent No. 6,535,481). The remaining dependent claims were also rejected over Ellinas and Andersson, in view of one or more

secondary references. These rejections are respectfully traversed in view of the amendments to the claims and the following arguments.

Conventionally, when traffic was switched from working to protection on a ring network such as a SONET/SDH ring, the same time slot would be allocated to the traffic on protection as was allocated to the traffic on the working path, so that the nodes on the ring would know which transmission unit, e.g. which time slot, on the protection path the connection would be located. (Specification at paragraph 8).

For various reasons, it may be advantageous to allow a given connection to use different time slots as it is transmitted around the ring. Thus, a connection may be on one time slot as it passes on a first link on the ring and shifted to a second time slot on the next link on the ring. While this may have advantages, it complicates the manner in which traffic is put onto protection. Specifically, if a failure occurs, the other nodes on the ring may not know where the traffic was put onto protection, which affects how they receive traffic from the protection path. (Specification at paragraph 9).

One attempt to address this problem was to use a centralized approach, whereby a centralized controller would generate tables and disseminate these tables to the nodes on the ring so that, upon occurrence of a failure, the nodes would know where the traffic would be located. (Specification at Paragraph 11).

Applicants are proposing an alternative to the use of a centralized approach, in which each network element on the ring is allowed to make an independent determination as to where traffic of particular interest will be located on protection. As described, for example, paragraphs 32-40, as connections are provisioned on the ring, the connection information such as the A/Z information, connection ID, and size information, is provided to all nodes on the ring. Upon occurrence of a failure on the ring, the nodes will determine which connections are affected by the failure. The nodes will then look at the connection information for each of the connections that are affected by the failure, and use the connection information to sort out how the connections will be assigned protection slots on the protection path. An example of a way in which the nodes may allocate protection transmission units is set forth in Paragraph 38. Thus, rather than having tables that are fixed in advance, the nodes calculate the placement dynamically based on the connection information associated with the connections that are affected by the failure.

The Examiner has taken the position that Ellinas teaches a system with protection switching, and acknowledges that Ellinas does not teach or show distributing connection information associated with flows on the protection cycle to all nodes on the protection cycle. This is central to the concept of how applicant's system works. Specifically, applicants distribute the connection information to each of the nodes so that the nodes may determine on their own where particular flows will be located. Since each node has the same information and performs the same calculation, each node can pull the correct flow off the correct location so that it is not necessary to centrally manage this process.

The Examiner has taken the position, however, that Andersson teaches this notion, citing Col. 4, lines 10-20. For convenience, this portion of the Andersson reference is reproduced below:

The router for each node monitors its own local links. When a link failure is detected, the router for an affected node quickly routes the data packet traffic over to the p-cycle 18. Then, the network routing protocol advertises the link failure so that the network can be re-routed without the failed link, and a loop-prevention mechanism determines that the re-routed network is loop-free. Packet traffic may then be switched to the re-routed network and new p-cycles recalculated as necessary.

As is clear from this passage, Andersson teaches distributing link failure notifications using a network routing protocol. Link status, such as whether the link is up or down, has nothing to do with connections that may be provisioned over the protection cycle.

Claim 1 recites a method that includes the step of “distributing connection information associated with flows”. This qualifier “associated with flows” modifies the term “connection information” so that the claim is clear that the information that is distributed on the network is connection information that is associated with flows. Link status is not information that is associated with flows. Rather, the link status is associated with the status of a particular link, and is not associated with any particular flows on the network.

Interpreting the term “connection information” to equate with a link failure notification would render claim 1 non-sensical. For example, applicants have re-written claim 1 below to replace “connection information associated with flows on the protection cycle” with “link failure notifications” as suggested by the Examiner.

1. (Previously Presented) A method of determining protection transmission unit allocation ..., the method comprising the steps of:
distributing *link failure notification* to all nodes on the protection cycle;
upon occurrence of a failure on the protection cycle, determining, by each node on the protection cycle, which flows are affected by the failure on the protection cycle....

As is clear from re-writing this claim, equating the link failure notifications with the “connection information associated with flows on the protection cycle” recited in claim 1 does not make sense. Specifically, the second step of the method recites “upon occurrence of a failure...” If the connection information contains link failure notifications, then there would be no need to have the conditional “upon” clause in the second step. Thus, applicants respectfully submit that the Examiner’s interpretation of claim 1 was unduly broad and, accordingly, respectfully request that the rejection of claim 1 over Ellinas and Andersson be withdrawn.

Since the link failure notifications of Andersson are not “connection information associated with flows...”, applicants respectfully submit that the combination of Ellinas and Andersson does not render the claims unpatentable under 35 USC 103. Specifically, neither Ellinas nor Andersson teach or suggests this feature. Accordingly, the Examiner is respectfully requested to withdraw this rejection.

Conclusion

In view of foregoing claim amendments and remarks, it is respectfully submitted that the application is now in condition for allowance and an action to this effect is respectfully requested. If there are any questions or concerns regarding the amendments or these remarks, the Examiner is requested to telephone the undersigned at the telephone number listed below.

Extension of time

Applicants request a two month extension of time to respond to the outstanding Office Action. Payment of the fee for the two month extension of time is being submitted herewith. If any additional fees are due in connection with this filing, the Commissioner is hereby authorized to charge payment of the fees associated with this communication or credit any overpayment to Deposit Account No. 502246 (Ref: NN-16220).

Respectfully Submitted

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